**Stoichiometry**

* Calculating quantities in chemical reactions.

Tricycle is made up of 3 wheels.

**1 Frame + 3 Wheels 🡪 1 Tricycle**

1. If I have 1 dozen frames, how many tricycles can I make?
   1. 1 dozen or 12
2. If I use 1 dozen wheels, how many tricycles can I make?
   1. 4 or 1/3 dozen
3. If I use 1 mole of frames, how many tricycles can I make?
   1. 1 mol tricycles
4. Does 100 lbs of frames equal 100 lbs of tricycles?
   1. **NO!** They’re not the same because they don’t weigh the same, they have different masses.

2 AgNO3 + H2S 🡪 Ag2S + 2 HNO3

2 moles of silver nitrate yields how many moles of silver sulfide?

1 mole silver sulfide

2 dozen silver nitrates yields how many dozen of silver sulfide?

1 dozen silver sulfides

Conversion factor:

2 mole AgNO3 = 1 mole Ag2S

1 mole H2S yields 1 mole Ag2S

Q1: How many moles of Ag2S will be produced from 3.5 moles of AgNO3?

3.5 mol AgNO3 x 1 mol Ag2S = **1.75 mol Ag2S**

2 mole AgNO3

But what about if grams are involved? . . . . . **Use molar mass!**

How many grams of Ag2S will be produced from 3.5 moles of AgNO3?

Step 1: Use the process from above to get 1.75 moles Ag2S

Step 2: calculate the molar mass of Ag2S 🡪 Ag + Ag + S = 107.9 + 107.9 + 32.1 = 247.8g

Step 3: 1.75 mol Ag2S x 247.8 g Ag2S = 433.65 g Ag2S

1 mol Ag2S

\*\* A balanced chemical equation tells the **mole : mole** ratio between different compounds in the equation.\*\*

grams x 🡪 mole x 🡪 mole y 🡪 grams y

\*\* Tell-tale sign of Stoichiometry – you will be given information about one substance and will be asked about a different substance.

given x 🡪 asked about y

Ex:

What is the mass of Mg(OH)2 will react with 1.20 g of HCl?

Mg(OH)2 + 2 HCl 🡪 MgCl2 + 2 H2O

1.20 g HCl x 1 mol HCl x 1 mol Mg(OH)2 x 58.3 g Mg(OH)2 = **0.956 g Mg(OH)2**

36.5 g HCl 2 mol HCl 1 mol Mg(OH)2